UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,810	06/03/2002	Stuart Elmes	B1104/7002	6385

23628 7590 01/24/2005

WOLF GREENFIELD & SACKS, PC
FEDERAL RESERVE PLAZA
600 ATLANTIC AVENUE
BOSTON, MA 02210-2211

EXAMINER	
GORDON, BRIAN R	

ART UNIT	PAPER NUMBER
1743	

DATE MAILED: 01/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/030,810	ELMES ET AL.	
	Examiner	Art Unit	
	Brian R. Gordon	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *6, 14-19, 30-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-13, 20-29, and 32-35* is/are rejected.

7)☒ Claim(s) *6, 14, 30-31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 15-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 08, 2004.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/GB00/02678, filed on July 12, 2000. ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(e) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(f) BRIEF SUMMARY OF THE INVENTION.
(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(h) DETAILED DESCRIPTION OF THE INVENTION.
(i) CLAIM OR CLAIMS (commencing on a separate sheet).
(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The proper section headings are missing.

Claim Objections

3. Claim 26 is objected to because of the following informalities: The claim depends upon non-elected claims. Appropriate correction is required.

4. Claims 6, 14, 30-31 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only and must not depend on any other multiple depended claims. See MPEP § 608.01(n). Accordingly, the claims 6, 14, 30-31 have not been further treated on the merits.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 34 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claims 34 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. The claims are improper for they refer to the figures. No reasonable interpretation cannot be established for the purpose of examination.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-5, 7-13 and 20-29, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martinsky US 6,101,946 in view of Chang et al. US 5,744,780.

Martinsky discloses a method for making a printing pin is also provided. A centerless shaft is ground to a designated outer diameter. Then the outer surfaces of the point of the pin are defined. A sample channel is **cut**, thereby creating a gap between the two halves of the point of the pin. Next, a rectangular collar is formed and attached to the non-printing end of the shaft. Finally, the width of the gap between the two halves of the point of the pin is adjusted, and a squared-off, flat tip at the printing end of the pin is formed (abstract). EDM is used to cut the sample channel.

In other embodiments of the present invention, points defined by EDM are subjected to **alternate cutting** technologies to form the sample channel 22. Stainless steel saw blades and possibly **lasers** can be used to form the sample channel 22. The important criteria of the sample channel 22 include a smooth and regular surface and a predefined volume, both of which are readily accomplished with EDM but could also be accomplished by other means. (column 5, lines 1-8)

The additional cut used to prepare the sample channel, and the attachment of the collar, the gap 30 at the tip of the pin that defines the sample channel 22, as shown in FIG. 3B, must be brought into closer proximity to provide optimal sample uptake and printing. Bending of the points is accomplished by applying uniform pressure on opposing points approximately 0.1" from the end of the points 20. Applied pressure

should be sufficient to move the opposing points to within several tenths (0.0003") of touching to allow relaxation of the points after the pressure is released. The gap 30 at the end of sample channel 22 after relaxation should be adjusted such that the two halves of the square pyramid form a gap 30 with a final width 204 of 0.0008-0.0010". (column 5, lines 24-48) The width of 0.0008 inches is approximately equal to 20 microns.

As seen in figures 3B and 4 (Martinsky), the upper portion (reservoir 40) of the sample channel has a uniform width near the outlet (30); a width larger than the outlet portion; a circular cross-section and the pin tapers towards the tip.

FIG. 6 shows pins 60 in a holder 10 (common base). However, the number and spacing of pins 60 contained in the holder 10 is variable.

Another embodiment of the present invention employs custom sample channels that can be modified to hold sample volumes up to 1.0-2.0 microliters. The capacity to use EDM to adjust the predefined volume of sample loaded allows the user to dictate the number of microarrays produced from a single loading. A typical pin, depicted in FIGS. 2A-2D, 3A, and 3B, will deposit approximately 1.0 nanoliter of biochemical sample, providing for approximately 200 microarrays for a sample channel 22 that holds 0.2 microliters. Larger sample channels that contain an expanded sample reservoir 40, as shown in FIG. 4, would allow as many as 1,000 microarrays to be produced from a single loading.

Other embodiments of the present invention allow for larger printing points that deliver up to 10 nanoliters of biochemical substance. This is accomplished by altering

the EDM cutting routine used to make the points. A point that has square outer dimensions of 3 mil X 3 mil (0.003 X 0.003) will produce a circular microarray element that is approximately 4 mil (0.004"; 101 microns) in diameter.

Martinsky does not disclose the width of 20 microns or less is achieved by copper vapor laser cutting.

Chang et al. disclose a material processing apparatus using a short-pulsed, high-repetition-rate visible laser for precision micromachining utilizes a near diffraction limited laser, a high-speed precision two-axis tilt-mirror for steering the laser beam, an optical system for either focusing or imaging the laser beam on the part, and a part holder that may consist of a cover plate and a back plate. The system is generally useful for precision drilling, cutting, milling and polishing of metals and ceramics, and has broad application in manufacturing precision components. Precision machining has been demonstrated through percussion drilling and trepanning using this system. With a 30 W copper vapor laser running at multi-kHz pulse repetition frequency, straight parallel holes with size varying from 500 microns to less than 25 microns. (abstract)

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper vapor laser cutting as taught by Chang et al. within the method of Martinsky in order to achieve a final gap width of less than 20 microns. The copper vapor laser cutting provides for a more precise desirable gap width (less than 20 microns) than what is achieved by bending the tip.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hasan, Leila et al.; Gilbert, John et al.; van Dam, R. Michael et al.; MacAulay, Calum E. et al.; Yang, Tom et al.; Ito; Seiichiro et al.; Gilbert; John; Moore; David Frank et al.; Iheme; Mordi I et al.; Kenney; James W; Schurenberg; Martin et al.; Feygin; Ilya; Jennings; Howard Timothy et al.; Piwczyk; Bernhard P.; Roach; David J. et al.; Lancaster, Jesse F.; Hugemann; Bernhard et al.; and Moreno; Mario disclose liquid transfer pins and laser machining devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Gordon whose telephone number is 571-272-1258. The examiner can normally be reached on M-F, with 2nd and 4th F off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

brg